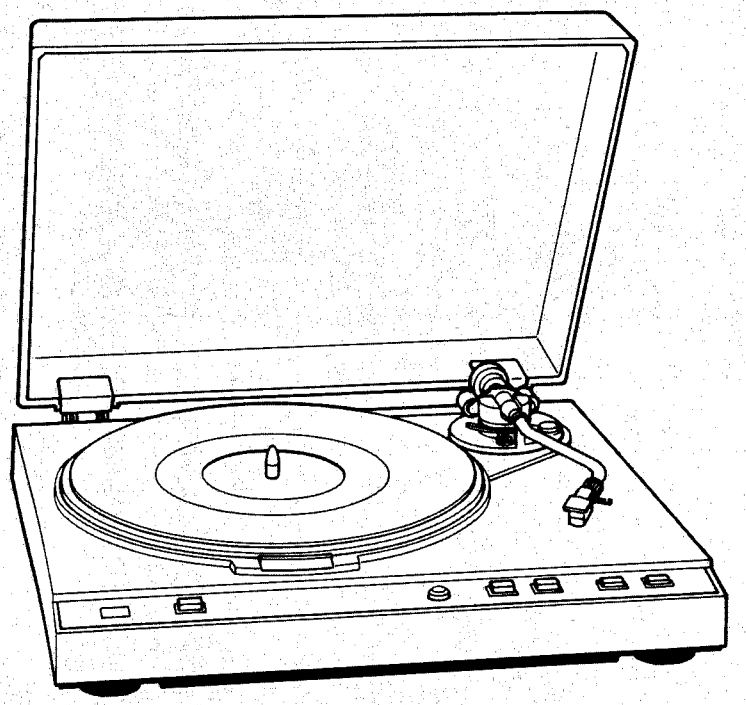
SERVICE MANUAL

COMPUTERIZED FULL AUTOMATIC DIRECT-DRIVE TURNTABLE

SANSUI FR-Q5



Sansui

SANSUI ELECTRIC CO., LTD.

SPECIFICATIONS

Type	Two-speed direct-driven
Speeds	33-1/3, 45 rpm
Platter	Aluminum alloy die-cast 300 mm (11-13/16") diameter, 1.3 kg (2.86 lbs)
Motor	DC Brushless servo-type (Quartz-servo)
Wow and flutter	Less than 0.025 % (WRMS) Less than 0.018 % (WRMS-read out direct at the FG output)
S/N	Better than 62 dB (IEC-B)
Rumble	Better than 75 dB (DIN-B)
Tonearm	Statically-balanced S-shaped tubular type
Tonearm length	220 mm (8-11/16")
Overhang	17.5 mm (3/4")
Optimum cartridge weight When the headshell supplied is employed	4 ~ 10 g
Dimensions	440 mm (17-11/32") W 133 mm (5-1/4") H 385 mm (15-5/32") D
Weight	6.9 kg (15.1 lbs) net 8.1 kg (17.9 lbs) packed
Power consumption	10 W (rated)

- The power voltage is adjusted to the one of the area where you bought the unit.

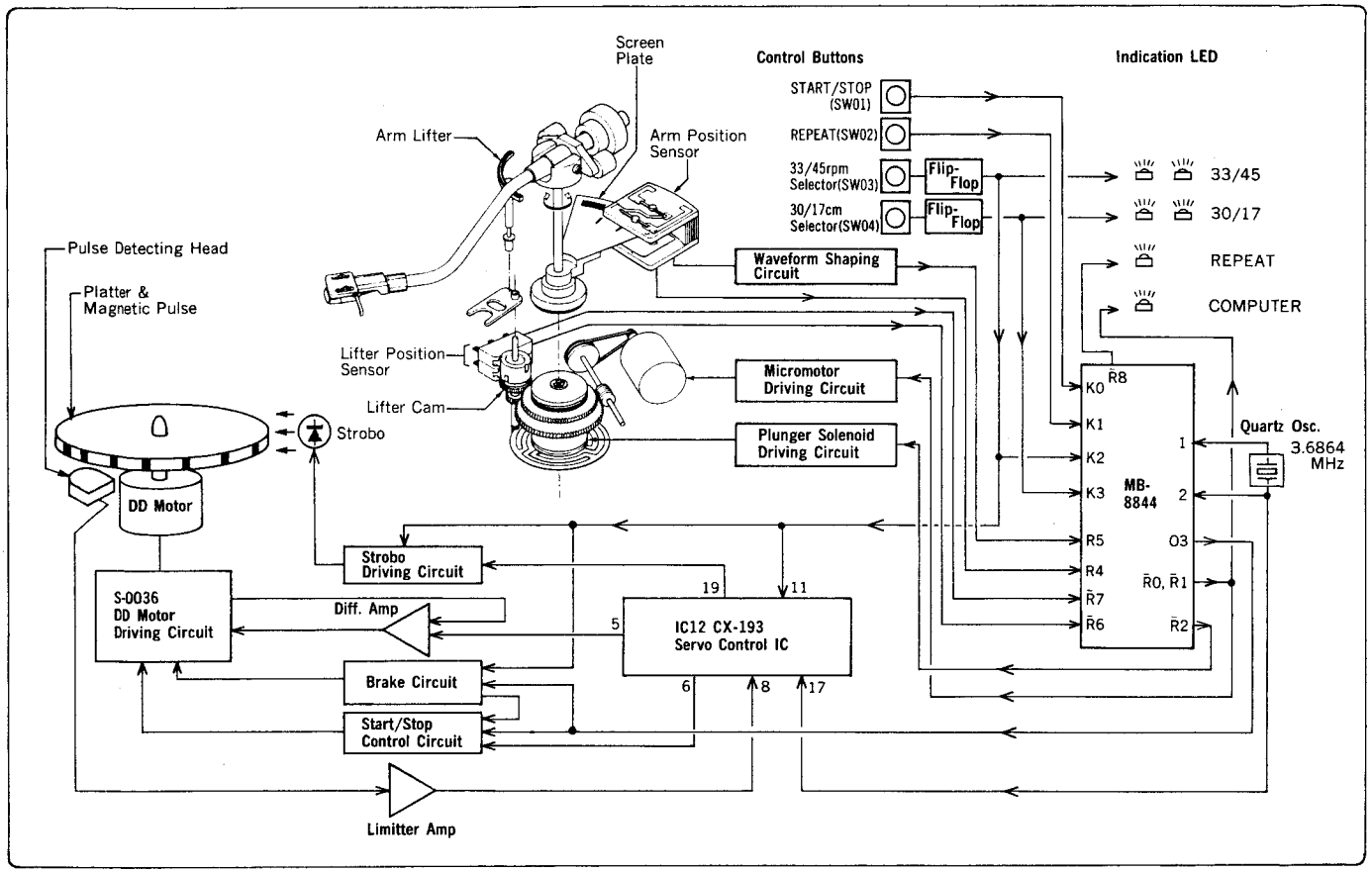
Specifications of the cartridge (applicable only to the units with cartridge)

Model SC-50

Type	Induced magnet
Frequency response	10 ~ 20,000 Hz
Output voltage	3 mV per channel (1,000 Hz, 35.4 mm/sec)
Load impedance	47 kΩ
Tracking force	2.5 g
Stylus	0.6 mil, diamond spherical (SN-50)

* Design and specifications subject to change without notice for improvements.
* In order to simplify the explanation illustrations may sometimes differ from the originals.

1. BLOCK DIAGRAM



2. OPERATION

2-1. General (See Block Diagram)

This model incorporates a DD motor control system composed of a quartz-servo circuit, an electronic braking circuit, start-stop control circuit, and etc. in addition to the full automatic system controlled by microcomputer similar to that of FR-D4.

The full automatic system – composed of the same Driving Mechanism Ass'y for Tonearm and Arm Lifter (here after called driving mechanism ass'y) and the same microcomputer as used in FR-D4 – works as in the same manner as FR-D4 that micro motor and plunger solenoid of driving mechanism ass'y are driven in accordance with signals from arm position sensor composed of LED and photo-transistor, that from lifter position sensor (micro switches), and in accordance with the procedure programmed in the microcomputer.

As regards the movement of driving mechanism ass'y, function of arm position sensor and lifter position sensor, and operation of microcomputer and peripheral circuit, see the service manual of FR-D4. The quartz-servo circuit employs servo-control unit IC (CX-193), where the pulse from detector of rotation speed is compared with the speed reference pulse from crystal oscillator to control the rotation speed of platter. By means of detecting 960 magnetic signals recorded in coating on the interior surface of platter by magnetic head (pulse detecting head), rotation speed is converted into electrical pulses proportionally (here after called speed detecting pulse). Thus, the large number of the detecting pulse compared with conventional one permit the highly accurate servo-control. The electronic braking circuit, consisting of monostable multivibrator, makes DD motor generate counter-torque for a certain term, in the case of both stopping turntable and changing speed selector 45rpm into 33rpm; thus, platter will be set stopped or steady rotation in an instant.

Start-stop circuit – which controls the DD motor running or stopping in accordance with the signal from microcomputer – stops DD motor when turntable rotates at twice the rated speed or some reason.

2-2. Operation of DD Motor Control System

A. Operation of quartz-servo system and CX-193.

The construction of quartz-servo system as shown in Fig. 2-1 is Phase/Speed control system which is combination use of F/V (frequency/voltage) converter and phase comparator.

Speed detecting pulse, generated at the pulse detecting head (which counts magnetic signals on platter), is fed to CX-193 via limitter amplifier.

In CX-193, trigger pulse generator delivers a pulse synchronized with speed detecting pulse to phase comparator, F/V converter, and sampling-hold circuit. At phase comparator, the input trigger pulse is compared with reference pulse (533.3 Hz/33rpm or 720 Hz/45rpm) which is produced by dividing output (3.6864 MHz) of crystal oscillator supplying timing pulse to microcomputer. And then, this output is applied to F/V converter as reference voltage via low pass filter.

F/V converter, which is the circuit to generate the proportional voltage to the rotation speed, produces triangular-wave whose peak-voltage corresponds the speed as shown in Fig. 2-4-e, to combine reference voltage from phase comparator and trigger pulse.

When trigger pulse is applied, sampling-hold circuit functions to keep the peak voltage of the F/V converter output until the next one is added. (See Fig. 2-4-f)

Next, this servo signal is supplied to differential amplifier through low pass filter, and controls DD motor driving circuit.

Fig. 2-3 and Fig. 2-4 show the system of F/V converter and the process of making servo signal. Triangular-wave shown in Fig. 2-4-c appears at pin 1 because external capacitor C1 repeats charging & discharging in accordance with on-off repetition of TR1.

This triangular-wave is compared with the reference voltage output from phase comparator, then becomes the square wave as in Fig. 2-4-d and switches the TR2.

Capacitor C3, therefore, repeats charging-discharging, and collector voltage of TR2 is formed as (e). The peak voltage of (e) is reduced in proportion to the frequency of speed detecting pulse as is shown in this figure. Sampling-hold circuit functions to keep the peak voltage of (e) when trigger pulse is applied until next one is added, and delivers it as a servo signal.

Fig. 2-1 Construction of Quartz-Servo System

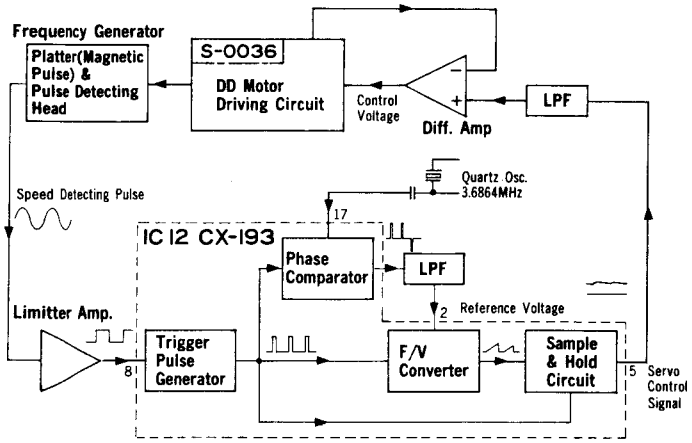


Fig. 2-2 Operation of Phase Comparator

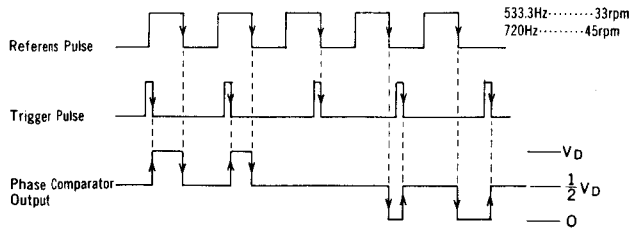


Fig. 2-3 Configuration of F/V Converter

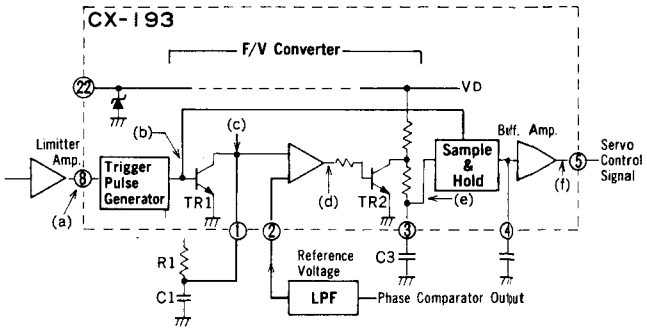
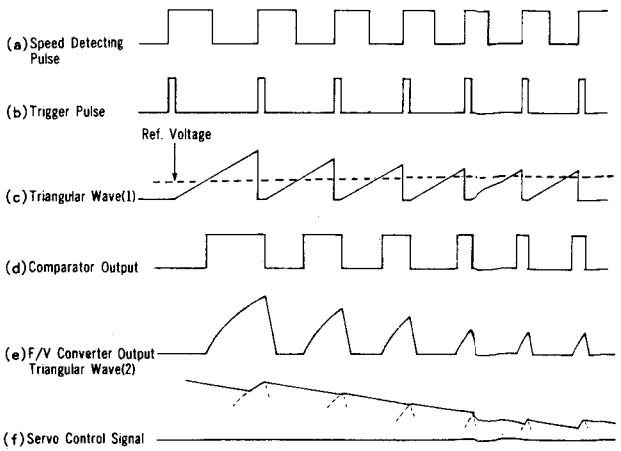


Fig. 2-4 Waveforms generated in F/V Converter



B. Operation of electronic breaking circuit (See Fig. 2-5)

Electronic breaking circuit has two lines, one functions when selecting rotation speed from 45rpm into 33rpm and the other is to stop turntable. Both of them let DD motor generated counter torque to turn on TR_{09} used in the DD motor driving circuit, which reverses the operation order of switching transistors (TR_{04} ~ TR_{06}) controlling driving current drawn through three driving coils.

1. Breaking operation in the speed selection (45rpm into 33rpm).

If the speed selector switch (SW_{03}) is pushed at 45rpm, the voltage level H at pin 3 (Q) of $IC_{08}a$ (flip flop) is reset L, so the collector voltage of TR_{28} is held L level. On the other hand, the voltage at pin 5 (servo signal output) of CX-193 goes down near 0V in the instant of selecting rotation speed, since rotation speed is beyond the rated speed (33rpm). Therefore, TR_{18} is OFF, TR_{28} is ON, and pin 5 ($\overline{B}$) of $IC_{10}a$ is L level now.

$IC_{10}a$ is monostable multivibrator, and its pin 10 ($\overline{F}$) is held L level for 200 msec that is set by time constant of C_{11} and R_{09}, when voltage level at pin 5 is turned L.

In the NOR gate $IC_{06}b$, output is H when an eather input is L, so its output 11 is H for 200 msec when pin 10 ($\overline{F}$) of $IC_{10}a$ is L, and TR_{09} is turned ON. Therefore, DD motor is breaked by counter torque for 200 msec and runs in the rated speed (33rpm).

2. Breaking operation to stop the platter.

When the tonearm is reset at the armrest, DD motor control output (O_3) of microcomputer is held L level to make it stop, and at the same time, breaking circuit works to give the motor counter torque for 400 msec.

If the output port O_3 of microcomputer/MB8844 is turned L, TR_{09} is OFF and input 1 of $IC_{13}a$ is H. Monostable multivibrator consisting of $IC_{13}a$ and $IC_{13}b$ is stable with Ⓗ and Ⓛ as shown in Fig. 2-5 when input 1 of $IC_{13}a$ is L, however; once input 1 of $IC_{13}a$ is turned H, output 4 of $IC_{13}b$ is turned H for the certain time (about 1 msec) which is set by time constant of C_{55} and R_{123}. On the other hand, platter is still running at the rated speed, so TR_{18} remains OFF and input 1 of $IC_{06}a$ remains H. Therefore, both input 1, 2 of $IC_{06}a$ are H while output 4 of $IC_{13}b$ is H, so output 3 is turned L to make pin 11 ($\overline{B}$) of $IC_{10}b$ L.

$IC_{10}b$ constitutes monostable multivibrator, and if its pin 11 ($\overline{B}$) is turned L, pin 9 is held L for about 400 msec which is set by the time constant of C_{12} and VR. During the time of 400 msec, input 12 of $IC_{06}b$ is held L and output 11 is held H, so TR_{09} in the driving circuit is turned ON to give the counter torque to the DD motor.

C. Operation of start-stop control circuit (See Fig. 2-5)

Start-stop control circuit feeds current to the driving coils of DD motor or stops it by controlling the collector voltages (0V at stop or 21V at start) of switching transistors TR_{04} ~ TR_{06} in the driving circuit. This control circuit, consisting of $IC_{06}c$, $IC_{06}d$, $IC_{13}d$, TR_{23} and TR_{24}, works corresponding to input signals from output port O_3 of microcomputer/MB8844, and pin 9 ($\overline{F}$) of $IC_{10}b$, as well as the rated & twice the rated speed detecting signals output from servo control IC, CX-193.

1. Operation of start-stop control circuit when DD motor starts rotation.

When DD motor is stopped with the state L at output port O_3, input-output voltage levels of $IC_{06}c$, $IC_{06}d$, and $IC_{13}d$, and the state of TR_{23} and TR_{24} are indicated in Fig. 2-5.

If output port O_3 is turned H, input 9 of $IC_{06}c$ is L and output 10 is H, so output levels of $IC_{06}d$ and $IC_{13}d$ are inverted to make TR_{23} and TR_{24} ON. Therefore, 21V is supplied to collectors of TR_{04}, TR_{05} and TR_{06} in the driving coil, which makes DD motor start rotating.

2. Operation of start-stop control circuit when DD motor is about to stop.

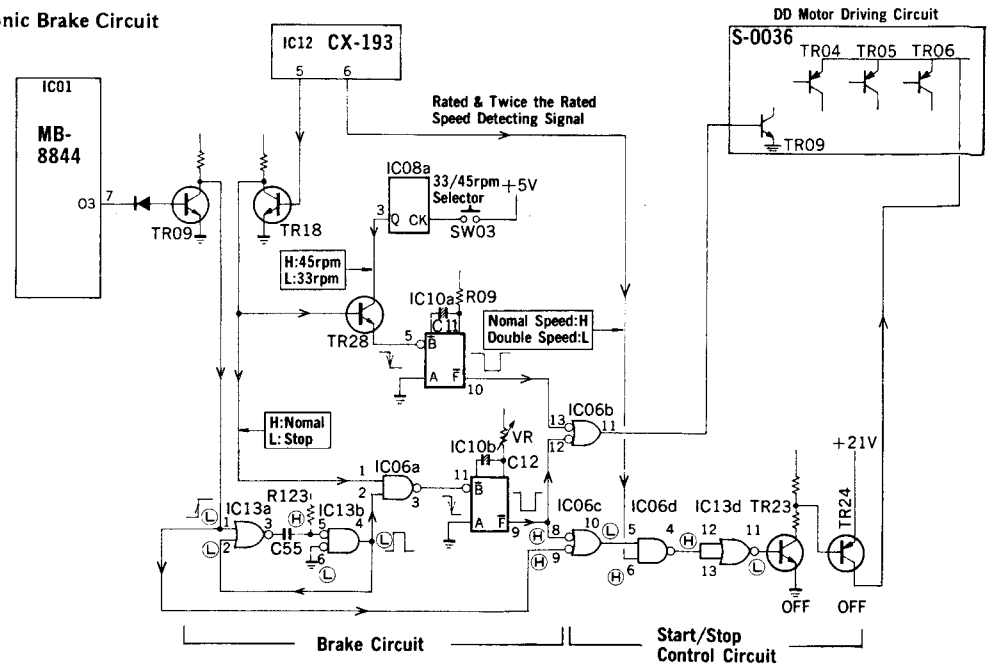
When output port O_3 is turned to L from H, pin 9 ($\overline{F}$) of $IC_{10}b$ is held L during 400 msec, so output 10 of $IC_{06}c$ keeps H in spite of input 9 ($\overline{F}$) of $IC_{06}c$ being H. Owing to these, it is continued that the voltage of 21V is supplied to the collectors of TR_{04}, TR_{05} and TR_{06} during 400 msec, and the current remains to flow in the driving coils. (Breaking circuit, however, holds TR_{09} ON to inverse the operation order of TR_{04} ~ TR_{06}, so counter torque is generated).

3. Start-stop circuit functioned by the rated & twice the rated speed detecting signal

The voltage level (the rated & twice the rated speed detecting signal) at pin 6 of CX-193 is turned to L from H when rotation speed reaches at twice the rated speed for some reasons, and is held the state until it rotates at the normal speed.

Once the rated & twice the rated speed signal is turned L, input 6 of $IC_{06}d$ becomes L, output 4 of $IC_{06}d$ is H, output 11 of $IC_{13}d$ is L, and TR_{23} and TR_{24} OFF, so the voltage of 21V at the collectors is dropped.

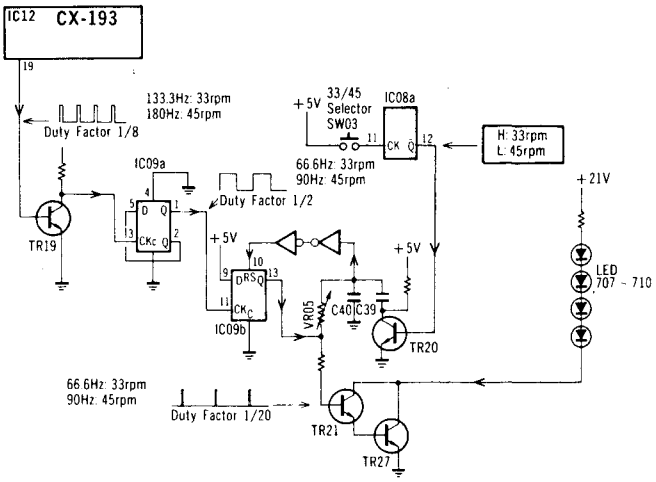
Fig. 2-5 Configuration of Electronic Brake Circuit and Start/Stop Circuit



D. Stroboscope circuit (See Fig. 2-6)

Besides the servo-control function, CX-193 acts as a frequency demultiplier, which divides down the reference pulse (3.6864 MHz) from crystal oscillator, and puts out the eather pulse (133.33 Hz/33rpm or 180 Hz/45rpm) whose duty factor is 1/8, via pin 19. These pulses are transformed into the pulse (66.6 Hz/33rpm or 90 Hz/45rpm) whose duty factor is 1/20, in $IC_{09}a$ and $IC_{09}b$, and then switches the transistors, TR_{21} and TR_{27}.

Fig. 2-6 Configuration and Operation of Strobo Driving Circuit



3. ADJUSTMENT (See Bottom View on page 11)

3-1. Auto-Return Adjustment

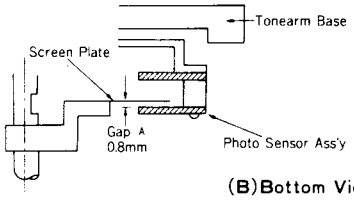
Note: Confirm whether trimmer resistor VR_{03} is attached on S-0035 or not, before performing "2. Adjustment of B-Sensor Output" and "3. Sensitivity Adjustment on Record-end Adjustment".

1. Installation of Screen Plate

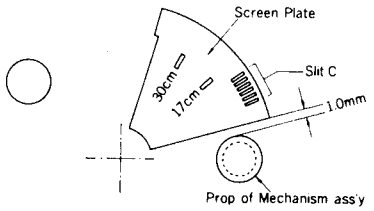
1) Place the tonearm on its rest.
2) Install a screen plate provisionally to the axle of tonearm as shown in Figs. 3-1 (A), (B).
3) Fix the screen plate firmly after "2. Adjustment of B-Sensor Output" is accomplished.

Fig. 3-1 Installation of Screen Plate

(A) Side View of Screen Plate



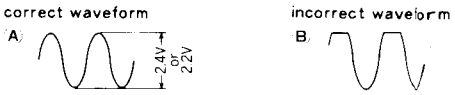
(B) Bottom View of Screen Plate
Note: Tonearm is placed on its rest.



2. Adjustment of B-Sensor Output

1-a) Place the tonearm on its rest.
1-b) Connect an oscilloscope to TP_{01} and TP_{02} (GND) on S-0035.
1-c) Set the DC/AC mode switch of the oscilloscope to "DC", the vertical gain to 1 V/Div., and the sweep rate to 1 msec./Div..
1-d) Adjust the voltage at TP_{01} to the middle level between 3.8 V and saturated voltage by turning VR_{02} (S-0032).
2-a) Set the vertical gain of oscilloscope to 1 V/Div., and the sweep rate to 0.1 sec./Div..
2-b) Bring the tonearm to the lead-out groove of disc and move it slowly inward and outward so that the slit-C of screen plate may cross the space between LED and photo transistor. By this, the waveform Ⓐ or Ⓑ shown in Fig. 3-2 can be observed.
2-c) Adjust the waveform on the display as shown in Fig. 3-2 Ⓐ by turning VR_{02} (S-0032)
Amplitude of the waveform is 2.4 V for the unit with trimmer resistor VR_{03} and 2.2 V for the unit without trimmer resistor VR_{03}.
* If the amplitude of the waveform on the display is too small or too large to adjust VR_{02} for the voltage indicated in Fig. 3-2, contact or widen the gap Ⓐ (See Fig. 3-1 between screen plate and sensor mounting board then repeat the adjustment 2-c) above).
3-a) Place the tonearm on its rest and confirm the voltage at TP_{01} is above 3.8 V.
3-b) Fix the screen plate firmly to the axle of tonearm.

Fig. 3-2 Output Waveform Adjustment on B-Sensor



*Adjust the waveform on display as Ⓐ
*Amplitude {2.4V ..... for the unit with trimmer resistor VR_{03}
2.2V ..... for the unit without trimmer resistor VR_{03}

3. Sensitivity Adjustment on Record-end Detection

A. Unit with trimmer resistor VR_{03} (S-0035)

1-a) Connect an oscilloscope to TP_{03} and TP_{02} (GND).
1-b) Set the DC/AC mode switch of oscilloscope to "DC", the vertical gain to 0.5 V/Div. and the sweep rate to 1 msec./Div. (This adjustment can be performed by making use of DC voltmeter)
2-a) Place the tonearm on its rest.
2-b) Adjust the voltage at TP_{03} to 3.5 V by turning VR_{03} (S-0035). (In case of using DC voltmeter with input impedance of 100kΩ/V or 20kΩ/V, adjust the voltage at TP_{03} to 3.5 V or 3.7 V respectively.)
3-a) Repeat following procedures ① and ② until the tonearm returns automatically at the record end.
① Check the auto-return operation (whether the tonearm returns automatically) by making use of a 30 cm disc with narrow (approximately 4 mm) pitch lead-out groove.
② Turn VR_{03} (S-0035) to decrease the voltage at TP_{03} by 0.1 V.
4-a) Confirm that the auto-return operation is properly performed at the record end.
4-b) Decrease the voltage at TP_{03} by 0.1 V in order to ensure the auto-return operation.
* In case of using DC voltmeter, remove lead wires of DC voltmeter from TP_{02} and TP_{03} when checking the auto-return operation.

B. Unit without trimmer resistor VR_{03} (S-0035)
Sensitivity Adjustment on Record-end Detection is not required for the unit without trimmer resistor VR_{03}.

3-2. Lead-in Position Adjustment

1) Confirm that the screen plate is installed as shown in Fig. 3-1 (A), (B).
2) Turn the adjusting cam (See 5. Exploded View, 7-1 Top View on page 6, 11) so as to fall the stylus to the middle of lead-in groove.

3-3. Rotation Speed Adjustment (PLL Adj.)

Note:
1) Before performing rotation speed adjustment for 33 r.p.m., proceed that of 45 r.p.m. at first.
2) Perform this adjustment to put rubber sheet on the platter.

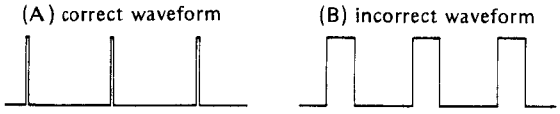
A. Adjustment with oscilloscope

1) Connect oscilloscope to TP_{04} and TP_{05} (GND) on S-0035 then set sweep rate and voltage gain to 0.5 msec./Div.and 2 V/Div. respectively.
2) Set speed selector (33/45) to 45 r.p.m..
   Make the waveform on oscilloscope as Fig. 3-3 (A) to turn VR_{02} on S-0035.
3) Set speed selector (33/45) to 33 r.p.m..
   Make the waveform on oscilloscope as Fig. 3-3 (A) to turn VR_{01} on S-0035.

B. Adjustment without oscilloscope

1) Set speed selector (33/45) to 45 r.p.m..
   Make strobo-marking-pattern appear to be standstill to turn VR_{02} on S-0035.
2) Set speed selector (33/45) to 33 r.p.m..
   Make strobo-marking-pattern appear to be standstill to turn VR_{01} on S-0035.

Fig. 3-3



*Adjust the pulse width as slender as possible.

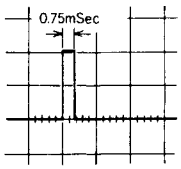
3-4. Electronic Break Adjustment

Note: Perform this adjustment to put rubber sheet on the platter.
1) Set speed selector to 33 r.p.m..
   Repeat DD motor to start and stop to move tonearm manually.
2) Adjust the efficiency of break by VR_{04} on S-0035, so as to stop the turntable immediately.

3-5. Adjustment of Duty Factor for Stroboscope

A. Adjustment with oscilloscope

Fig. 3-4



1) Connect oscilloscope to TP_{08} and TP_{09} on S-0035 then set sweep range and voltage gain to 2msec./Div. and 5V/Div. respectively.
2) Adjust the width of pulse to 0.75 msec. to turn VR_{05} (See Fig. 3-4)

B. Adjustment without oscilloscope

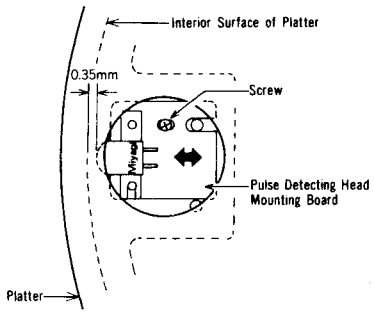
Adjust VR_{05} to center position within the range where stroboscope is lighting.

3-6. Adjustment of Gap between Pulse Detecting Head and Interior Surface of Platter

Note: Perform this adjustment when replacing pulse detecting head or platter.

- Fix pulse detecting head so as to obtain 0.35 mm gap between the head and interior surface of platter to put a spacer in the gap. (The thickness, 0.35 mm can be obtained to pile three pieces of service manual cover paper)

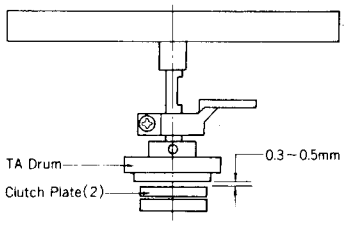
Fig. 3-5



3-7. Adjustment of Gap between TA Drum and Clutch Plate (2)

Adjust the gap between TA drum and clutch plate (2) so as to become 0.3 ~ 0.5 mm as shown in Fig. 3-6 when tonearm ass'y, slit plate, TA drum, or clutch plate is replaced.
Arm base is able to install without removing automechanism ass'y.

Fig. 3-6



4. MAIN PARTS REPLACEMENT (See 5. Exploded View on page 6)

4-1. Replacement of Tonearm Ass'y (55)

1) Remove the bottom cover.
2) Loosen 3 screws (7) to remove the mechanism ass'y.
3) Loosen the screw (35) to remove the TA drum.
4) Loosen the screw (37) to remove the screen plate.
5) Remove lead wires of the tonearm soldered on the terminal board (S-0029).
6) Remove the spring of inside force canceler.
7) Loosen the fixing nut to pull out the tonearm.

* Refer to Fig. 3-1 (A), (B) and 3-6, when installing screen plate and TA drum.

4-2. Replacement of Plunger Solenoid Ass'y (16)

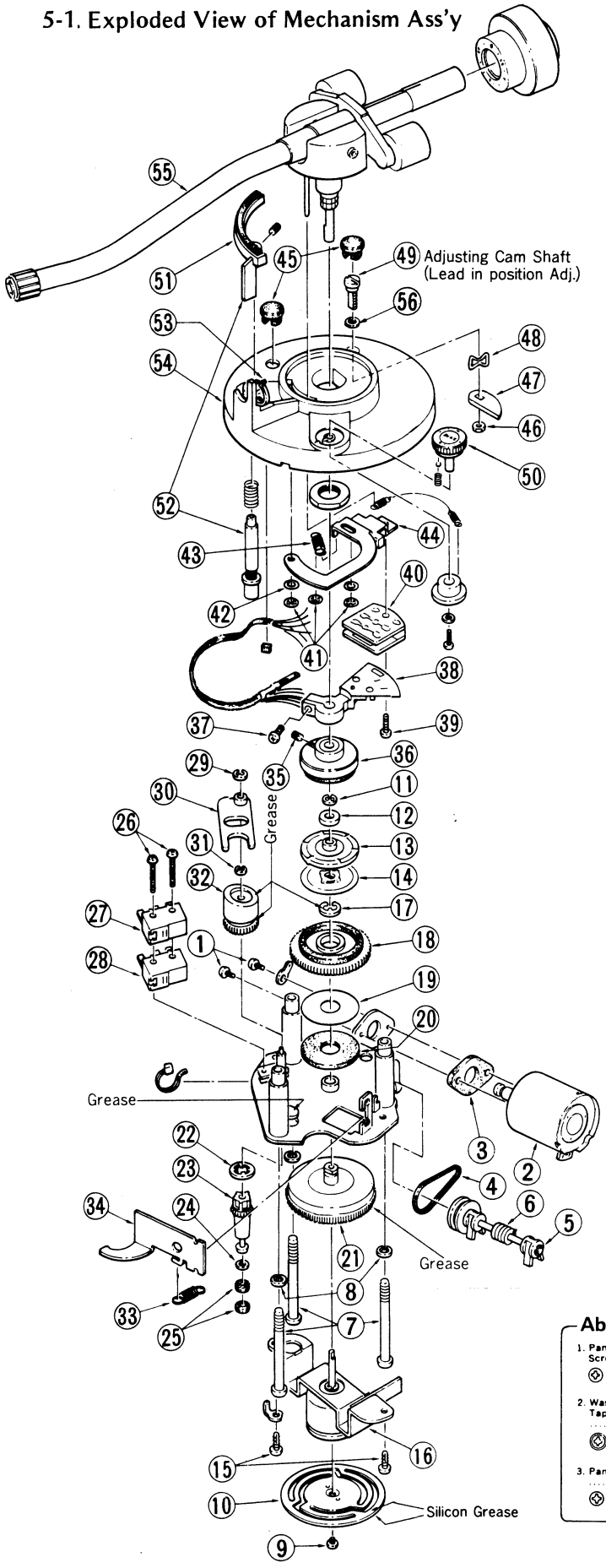
1) Remove the bottom cover.
2) Loosen 3 screws (7) to remove the mechanism ass'y.
3) Remove E type washer (11).
4) Loosen 2 screws (15) to take out the plunger solenoid ass'y.

4-3. Note on Parts Replacement

1) When replacing friction pulleys, insert 2 pulleys to gear (3) to face their smoothed surface each other.
2) When replacing photo-transistors on the photo-sensor ass'y, attach the photo-transistor so as to meet the center of photo-transistor to the slit of photo-sensor ass'y.

5. EXPLODED VIEW OF MECHANISM Ass'y & PARTS LIST

5-1. Exploded View of Mechanism Ass'y



Parts List

Parts No.	Stock No.	Description
1	00436500	P Type Screw, M2 x 4
2	43206400	Micro Motor Ass'y
3	55029800	Rubber Cushion
4	60322300	Drive Belt
5	00488900	E Type Washer, D1.5
6	70321310	Worm Gear Ass'y (Worm Gear, Shaft, E Type Washer D1.5, Pulley, Bearing)
7	51628300	Tapping Screw, M4 x 42
8	00469800	S Type Washer M4.0 x 14
9	00436500	P Type Screw M2 x 4
10	61423700	Friction Disc
11	00489000	E Type Washer, D2.0
12	51831700	Damping Washer (2)
13	64220810	Clutch Plate (2)
14	64220700	Clutch Plate (1)
15	00440900	PT Type Screw Type 2, 3 x 8
16	43402400	Plunger Solenoid Ass'y
17	00489400	E Type Washer, D5.0
18	60020700	Gear (2)
19	51831500	Thrust Washer
20	51831600	Damping Washer (1)
21	60020600	Gear (1)
22	51832300	CS Ring, M5.0
23	60020810	Gear (3)
24	51825700	Thrust Washer, M4 x 0.5
25	61423600	Friction Pulley
26	00436600	P Type Screw, M2 x 16
27	11602700	Micro Switch,
28	11602700	Micro Switch,
29	00489000	E Type Washer, D2.0
30	65122000	Lifter Guide
31	00489000	E Type Washer, D2.0
32	60125400	Lifter Cam
33	69034100	Tension Spring (1)
34	70721310	Brakeshoe Ass'y
35	51623300	SC Type Screw, M3 x 5
36	65121900	TA Drum
37	00440900	PT Type Screw 3 x 8
38	70623810	Screen Plate Ass'y
39	51628800	P Type Screw, M2.5 x 10
40	77900100	Photo Sensor Ass'y
41	51831800	CS Ring, M2.4
42	51832000	Thrust Washer, 2.5 x 0.5
43	69034200	Tension Spring (2)
44	65030000	Sensor Mounting Arm
45	50624800	Lid
46	00463600	H Type Nut M3 x 2.4
47	60125600	Adjusting Cam (2)
48	51832100	Wave Washer, M4
49	62025710	Adjusting Cam Shaft
50	69126600	IFC Ass'y (Knob, Thread, Spring, Screw, Wahser, Steel Ball)
51	70823400	Lifter Plate Ass'y
52	70823600	Lifter Ass'y (Lifter Plate Ass'y, Lifter Piston Ass'y)
53	66223100	Armrest Fook Ass'y (Fook, Screw)
54	70929300	Armbase
55	70929500	Tonearm Ass'y
56	51823300	Thrust Washer 4.0 x 0.25

Abbreviations

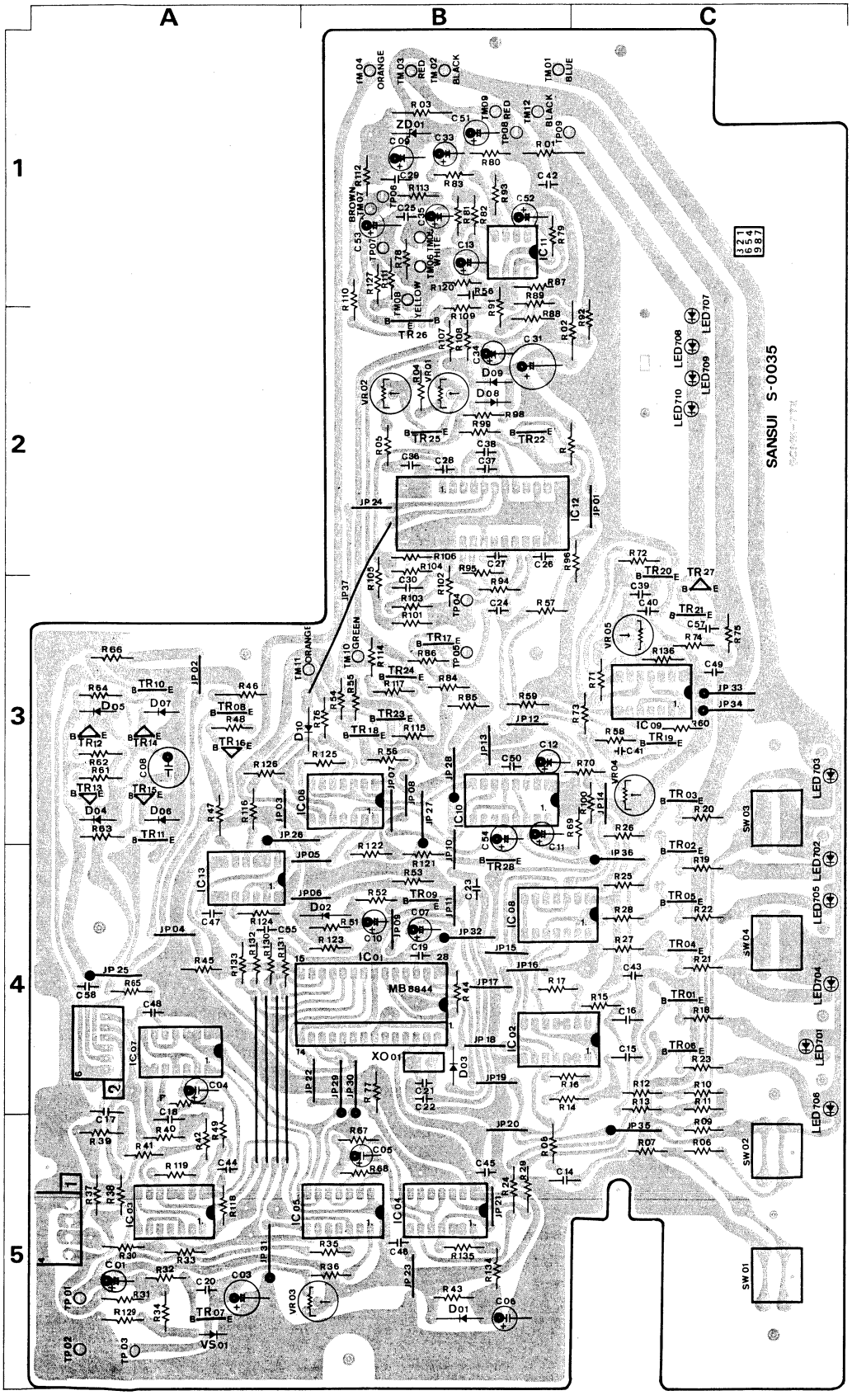
1. Pan Head Tapping Screw ..... PT Type
2. Washer Head Tapping Screw ..... WT Type
3. Pan Head Screw ..... P Type
4. Pan Head SEMS A Screw ..PSA Type
5. Pan Head SEMS B Screw ..PSB Type
6. Binding Head SEMS F Screw ..... BSF Type
7. Binding Head Screw.....B Type
8. Flat Countersunk Head Screw ..... F Type
9. Flat Countersunk Wood Screw ..... FC Type
10. Round Head Wood Screw ..... RH Type
11. Hex. Socket Setscrew ..... SC Type
12. Slot Type Setscrew ..... SS Type
13. Spring Washer ..... S Type
14. Plain Washer ..... P Type
15. Retaining Ring (E Washer) ..... E Type

6. PARTS LOCATION & PARTS LIST

6-1. S-0035 Computerized Control Circuit Board (Stock No. 75982201)

- Since some of capacitors and resistors are omitted from parts lists in this Service Manual, refer to the new Common Parts List for capacitors & resistors.
- As the stock number in the parts list on this service manual is indicated in 8 digit to differ from ordinary 7 digit, please be careful when ordering parts.

Conductor Side

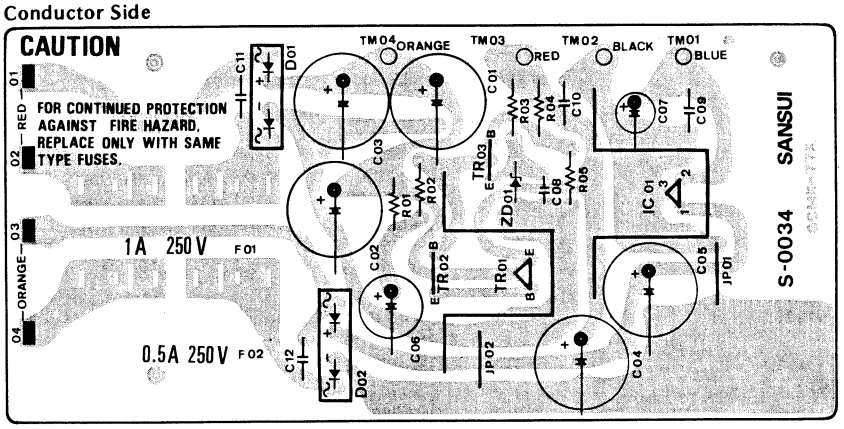


Parts List

Parts No.	Stock No.	Description
•Transistor		
TR01 ~ 06	03059501 ~ 3	2SC945 Q,P,K
TR07	03059501	2SC945 Q
TR08 ~ 11	03059501 ~ 3	2SC945 Q,P,K
TR12, 13	03012200, 1	2SA934 P,Q
TR14, 15	03069100, 1	2SC2060 P,Q
TR16	03033601, 2	2SB560MP E,F
TR17	03059503	2SC945 K
TR18	03059502, 3	2SC945 P,K
TR19, 20	03059501 ~ 3	2SC945 Q,P,K
TR21	03059503	2SC945 K
TR22, 23	03059501 ~ 3	2SC945 Q,P,K
TR24, 25	03005100, 1	2SA733A P,Q
TR26	03602900, 1	2SA798 F,G
TR27	03069100, 1	2SC2060 P,Q
TR28	03059501 ~ 3	2SC945 Q,P,K
•IC		
IC01	03610200	MB8844
IC02 ~ 04	03605700	MSM4069
	07107600	TC4069UBP
IC05, 06	03604000	MSM4011
	03604100	TC4011P
	07106900	MSM4011BRU
IC07	03609500	MSM4001RS
	03610500	TC4001BP
	07186600	MB84001BN
	07186700	MC14001B
IC08, 09	03611700	MSM4013RS
	07107500	TC4013BP
	07107000	MSM4013BRU
IC10	03612900	TC4528BP
IC11	03607700	NJM4558D
IC12	03612800	CX-193
IC13	03609500	MSM4001RS
	03610500	TC4001BP
	07186600	MB84001BN
	07186700	MC14001B
XO01	09300600	NC-18C Crystal, 3.6864 MHz
•Diode		
D01, 02	03103300	1N60-0
D03 ~ 10	03111600	1S2473D
D11	03111600	1S2473D
D12, 13	03111600	1S2473D
•Zener Diode		
ZD01	03158900	EQA01-1
VS01	03401200	VD1212
•LED		
LED701	03192600	PG5534SX (Green), Computer
LED702 ~ 706	03192500	PR5534S (Red), 33/45, 30/17, Repeat
LED707 ~ 710	03194400	LED (Red), Strobo
R01	00182100	33Ω 1W N.F.R.
R02	00181700	270Ω 1W N.F.R.
R03	00183800	560Ω 1W N.F.R.
R04	00208900	47kΩ 1/4W M.R.
R05	00202600	150kΩ 1/4W M.R.
C04, 05	00306800	1μF 50V B.P.
VR01	10343100	47kΩ (B) PLL Adj. 33 r.p.m.
VR02	10343100	47kΩ (B) PLL Adj. 33 & 45 r.p.m.
VR03	10351500	22kΩ (B) Beginner Sensitivity Adj.
VR04	10352500	1MΩ (B) Brake Time Adj.
VR05	10351900	100kΩ (B) Strobo Duty Factor Adj.
SW01 ~ 04	11907000	Key Switch, START/STOP, REPEAT 33/45, 30/17

6-2. S-0034 Power Supply Circuit Board (Stock No. 75035601)

Conductor Side



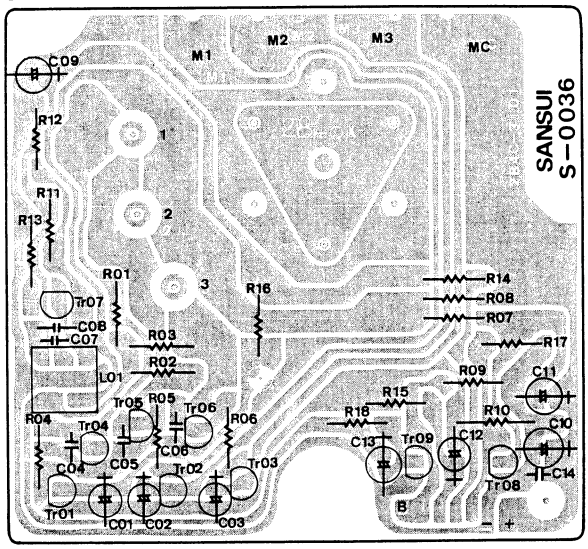
Parts List

Parts No.	Stock No.	Description
•Transistor		
TR01	03083902, 1	2SD313AL E, F
TR02, 03	03059503	2SC945 K
•IC		
IC01	03609200	FS7805M
	07183500	μPC78M05H
•Diode		
D01, 02	03117000	RB-152
•Zener Diode		
ZD01	03166300	RD5.1 (E)
R01	00149900	560Ω 2W N.I.R.
C11	00407800	0.047μF 100V F.C. (m)
F01	04350900	Timelag Fuse 800mA 250V, (EU, BS)
	04322200	AC Fuse 1.0A 250V (XX, CS)
F02	04322100	AC Fuse 0.5A 250V (XX, CS)
	04350600	Timelag Fuse 400mA 250V, (EU, BS)

•The circuit boards, S-0036, S-0028 & S-0032 are not supplied as the assembled, the individual parts on the circuit boards, however are provided for orders.

6-3. S-0036 DD Motor Driving Circuit Board

Conductor Side



Parts List

Parts No.	Stock No.	Description
•Transistor		
TR01 ~ 03	03085901, 2	2SD471 L, K
TR04 ~ 06	03005100, 1	2SA733 Q, P
TR07 ~ 09	03059501 ~ 3	2SC945 Q, P, K
L01	42905000	OSC Coil

6-4. S-0028 Power Fuse Circuit Board

Parts List

Parts No.	Stock No.	Description
C01	00351200	0.033μF 250V F.C. (XX)
	00379300	0.033μF 125V F.C. (CS)
	00336800	0.033μF 250V M.P. (EU, BS)
F01	04322100	AC Fuse 0.5A 250V (XX, CS)
	04351900	Timelag Fuse 80mA 250V (EU, BS)

6-5. S-0032 B-Sensor Sensitivity Adjusting Circuit Board

Parts List

Parts No.	Stock No.	Description
VR02	10353500	4.7kΩ (B) B-Senser Sensitivity Adj.

•Note

As to C.S.A., B.S., ES, and xx marked in the Parts Lists, note the followings:

- C.S.A. ..... Parts used in the unit which is applicable to Canada under industrial standards.
- B.S. ..... Parts used in the unit which is applicable to British under industrial standards.
- E.U. ..... Parts used in the unit which is applicable to Sweden, Denmark, Norway, Finland, West Germany, and Switzerland under industrial standards.
- XX ..... Parts used in the unit which is applicable to other countries excepting mentioned above.

•Abbreviations

- C.R. ..... Carbon Resistor
- S.R. ..... Solid Resistor
- Ce.R. ..... Cement Resistor
- M.R. ..... Metal Film Resistor
- F.R. ..... Fusing Resistor
- N.I.R. ..... Non-Inflammable Resistor
- C.C. ..... Ceramic Capacitor
- C.T. ..... Ceramic Capacitor, Temperature Compensation
- E.C. ..... Electrolytic Capacitor
- E.L. ..... Low Leak Electrolytic Capacitor
- E.B. ..... Bi-Polar Electrolytic Capacitor
- E.BL. ..... Low Leak Bi-Polar Electrolytic Capacitor
- Ta.C. ..... Tantalum Capacitor
- F.C. ..... Film Capacitor
- M.P. ..... Metalized Paper Capacitor
- P.C. ..... Polystyrene Capacitor
- G.C. ..... Gimmic Capacitor

7. OTHER PARTS

Parts List <Top View>

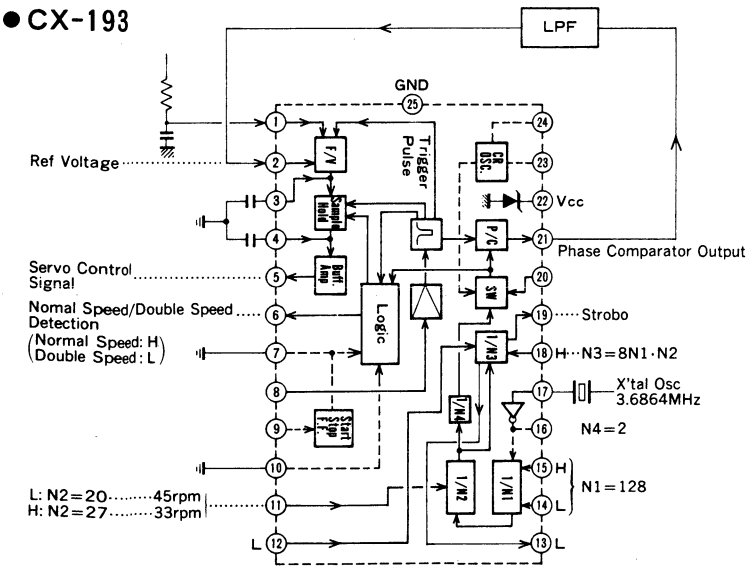
Parts No.	Stock No.	Description
1	61720400	EP Adaptor
2	45030400	Pulse Detecting Head
3	61122400	Platter
4	55029610	Rubber Sheet
5	54420400	Strobo Cover
6	03194400	Strobo (LED, Red)
7	53626600	Control Plate
8	53221800	Power Switch Knob
9	53922400	Power Switch Knob Guide
10	11312300	Power Switch
11	54220300	Indicator Lens, (REPEAT, 30/17, 33/45)
12	03192500	LED (PR-5534S), (REPEAT, 30/17, 33/45)
13	54220400	Indicator Lens, (COMPUTER)
14	03192600	LED (PG-5534SX), (COMPUTER)
15	71021100	Key Switch Knob Ass'y (Knob, Knob Guide, Cushion, Plastic Washer, E type Washer 3.2ϕ)
16	11907000	Key Switch (START/STOP, REPEAT, 30/17, 33/45)
17	66423600	Head Shell
18	43103700	Cartridge Ass'y, SC-50 (XX)
19	49402300	Stylus, SN-50 (XX)
20	51921600	Screw for Stylus (XX)
21	70929500	Tone Arm Ass'y (Without Main Weight, Head Shell)
22	66223100	Armrest Fook Ass'y (With Fook, Screw)
23	69126600	I.F.C. Ass'y (With Knob, Drum, Thread Spring, Screw, Washer, Steel Ball)
24	70929300	Armbase
25	70823400	Lifter Plate Ass'y
26	70823600	Lifter Ass'y (With Lifter Plate Ass'y, Lifter Piston Ass'y)
27	69126900	Main Weight Ass'y
28	69224100	Auto Hinge
29	70122210	Dust Cover Ass'y (With Cushion)
30	55029500	Dust Cover Cushion
31	50624800	Lid

Parts List <Bottom View>

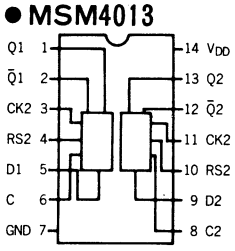
Parts No.	Stock No.	Description
1	70721100	Insulator
2	51824000	Washer, insulator
3	51099050	Screw M3 x 12, insulator
4	40032400	Power Transformer (XX)
	40032402	Power Transformer (CS)
	40032404	Power Transformer (EU, BS)
5	11907200	AC Voltage Selector Switch (EU, BS)
	11907300	AC Voltage Selector Switch (XX)
6	39106000	Strain Relief (3ϕ) (XX, CS)
	39104900	Strain Relief (4ϕ) (EU, BS)
7	38004700, 1	Power Cord (XX, CS)
	38004300	Power Cord (BS)
	38004500	Power Cord (EU)
8	39105700	Strain Relief (5ϕ)
9	38103400	P.U. Output Cord
	38103600	P.U. Output Cord
10	43206400	Micro Motor
11	43206900	D.D. Motor Ass'y (with Motor Control Circuit Board S-0036)

8. INTERIOR BLOCK DIAGRAM OF IC

● CX-193

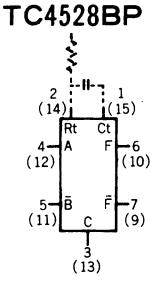


● MSM4013



INPUT				OUTPUT	
CK	D	C	RS	F	F̄
↑	L	L	L	L	H
↑	H	L	L	H	L
—	—	L	H	L	H

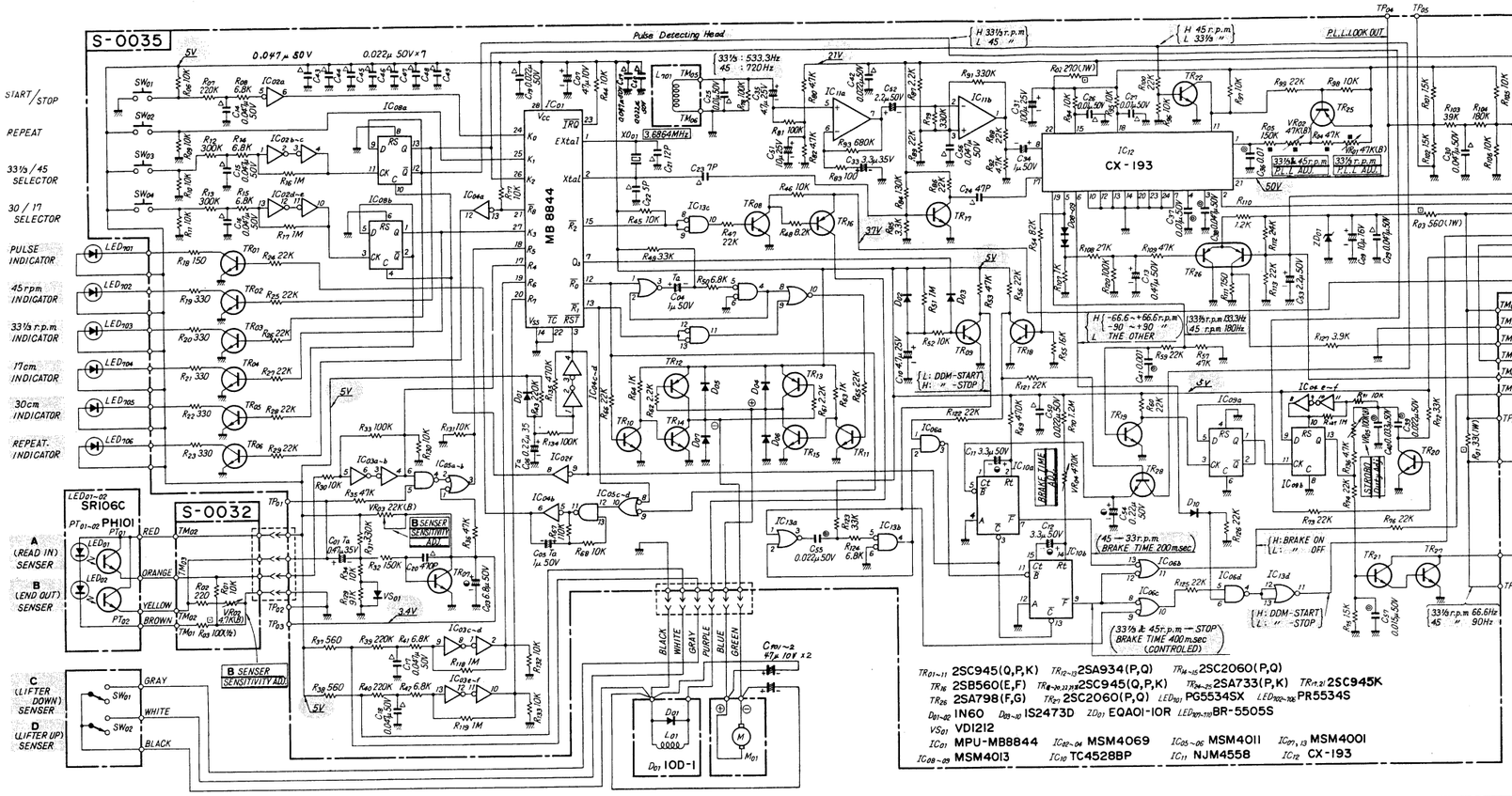
● TC4528BP



INPUT			OUTPUT	
A	B̄	C	F	F̄
L	↓	H	⊓	⊔

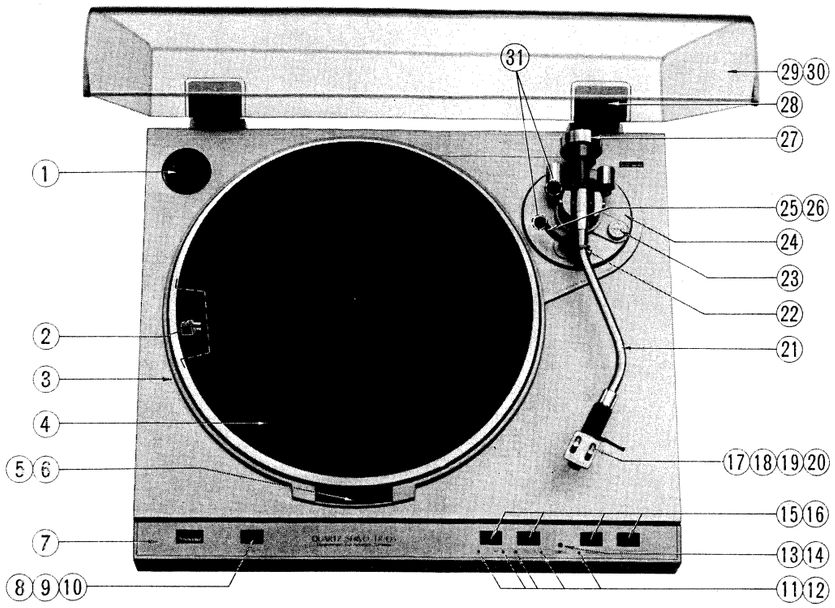
- Design and specifications subject to change without notice for improvement.
- La présentation et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
- Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.

9. SCHEMATIC DIAGRAM

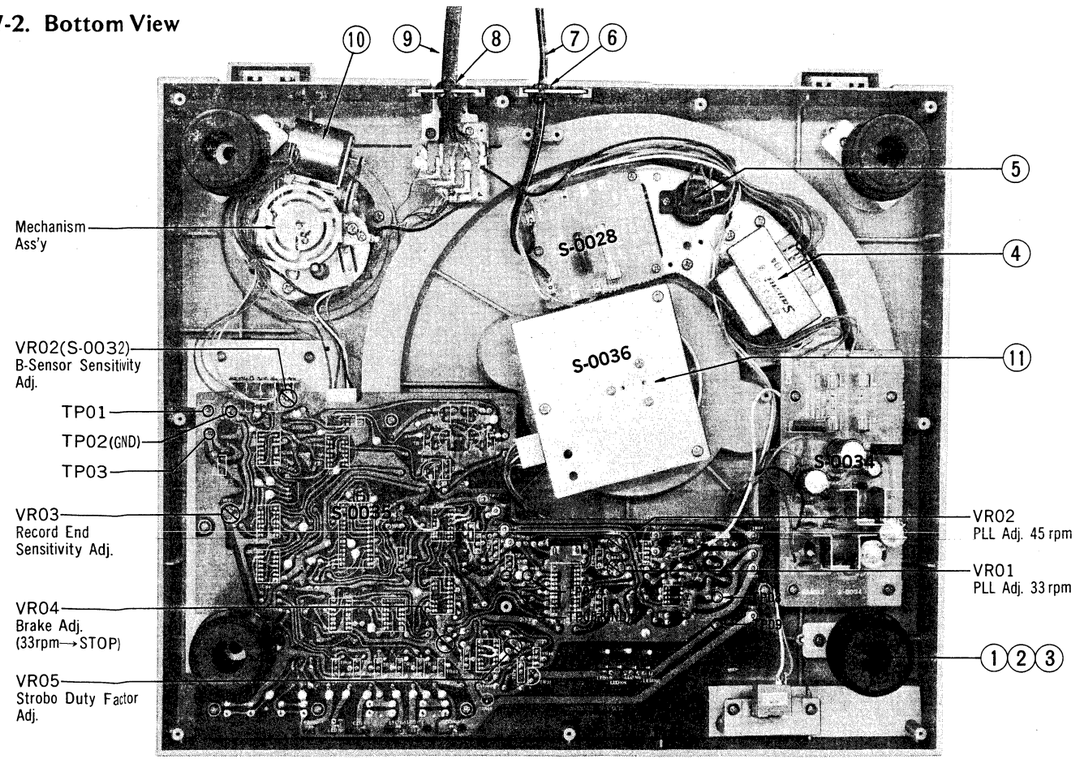


TR01~11 2SC945(Q,P,K) TR12~13 2SA934(P,Q) TR14~15 2SC2060(P,Q)
TR16 2SB560(E,F) TR17~20,22,23 2SC945(Q,P,K) TR21~25 2SA733(P,K) TR27,31 2SC945K
TR26 2SA798(F,G) TR32 2SC2060(P,Q) LED101 PG5534SX LED102~106 PR5534S
DD1~02 IN60 DD3~10 1S2473D ZD01 EQA01-10R LED107~110 BR-5505S
VS01 VD1212
IC01 MPU-MB8844 IC02~04 MSM4069 IC05~06 MSM4011 IC07,13 MSM4001
IC08~09 MSM4013 IC10 TC4528BP IC11 NJM4558 IC12 CX-193

7-1. Top View



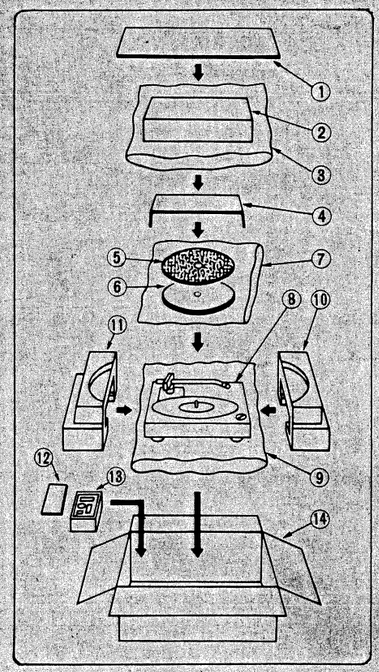
7-2. Bottom View



FR-Q5

10. PACKING LIST

Parts No.	Stock No.	Description
1	90123200	Protector Board, upper
2	70122210	Dust Cover Ass'y
3	91221110	Polyethylene Bag for Dustcover Ass'y
4	90123700	Protector Board, platter
5	55029610	Rubber Sheet
6	61122400	Platter
7	91166000	Polyethylene Bag for Platter
8		Turntable Unit
9	91122700	Polyethylene Bag for Turntable Unit
10	90226700	Styrofoam Packing, front
11	90226800	Styrofoam Packing, rear
12	90226600	Protector Sheet, accessory box
13	90226900	Accessory Box
14	90029000	Carton Case



11. ACCESSORY PARTS LIST

	Stock No.	Description
	69126900	Main Weight Ass'y
	66423600	Head Shell
	43103700	Cartridge Ass'y, (SC-50) (XX)
(	49402300	Stylus, SN-50 (XX)
|	51921600	Screw Ass'y (XX)
	61720400	EP Adaptor
	69224100	Auto Hinge
	52425900	Cartridge Mounting Guage
	92323100	Schematic Diagram (XX, EU)
	92051500	Operating Instructions

Sansui

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